WHAT IS CLAIMED IS:

1. A method for generating a model of a circuit having an input port and an output port, said method comprising:

determining an amplitude for current leaving said output port at a frequency ω_k when a signal comprising a carrier at ω_j modulated by a signal $V_j(t)$ is input to said input port, wherein ω_k is a harmonic of ω_j;

using said determined amplitude to determine values for a set of constants, $\mathbf{a}^k$, such that a function $f_k(\mathbf{V},\mathbf{a}^k)$ provides an estimate of the current, $I_k(t)$, leaving said output port at a frequency ω_k when a signal having the form

$$V(t) = \operatorname{Re} \sum_{k=1,H} V_k(t)\exp(j\omega_k t)$$

is input to said input port, where $V_k(t)$ is a component of the set of values $\mathbf{V}$; and

providing a simulator component adapted for use in a circuit simulator, said simulator component having a first simulator input port and a simulator output port, said component returning a value, $f_k(\mathbf{V},\mathbf{a}^k)$, via said simulator output port when said simulator provides values for $\mathbf{V}$ at said first simulator input port for at least one value of k.

2. The method of Claim 1 wherein said simulator component also returns $f_k(\mathbf{V},\mathbf{a}^k)$ via said simulator output port when said simulator provides values for $\mathbf{V}$ at said first simulator input port for at least two values of k.

3. The method of Claim 1 wherein said amplitude is determined by applying an electrical signal to said circuit and measuring a signal at said output port.

4. The method of Claim 1 wherein said amplitude is determined on a circuit simulator by simulating an electrical signal being applied to said circuit.

5. The method of Claim 1 wherein said circuit simulator is a transient envelope simulator.

6. The method of Claim 1 wherein $f_k(\mathbf{V},\mathbf{a}^k)$ is evaluated by a neural network that was trained with a training set comprising said determined amplitude.

7. The method of Claim 6 wherein $f_k(\mathbf{V},\mathbf{a}^k)$ comprises a weighted sum of basis functions.

8. The method of Claim 1 wherein $f_k(\mathbf{V},\mathbf{a}^k)$ further depends on an input derived from **V** and wherein said simulator component further comprises a second simulator input port and

a computational component having a component input port and a component output port, said component input port being connected to said first simulator input port and said component output being connected to said second simulator input port, said computational component generating a signal derived from **V** on said component output port when said input port receives a signal specifying **V**.

9. The method of Claim 3 wherein said signal generated by said computational component further depends on the time derivative of $I_k(t)$ for at least one value of k.

10. The method of Claim 8 wherein said computational component comprises a circuit component that is provided in a simulator component library.

11. A method for generating a model of a circuit having an input port and P output ports, where P>1, said method comprising:

determining an amplitude for current leaving each output port at a frequency ω_k when a signal comprising a carrier at ω_j modulated by a signal $V_j(t)$ is input to said input port, wherein ω_k is a harmonic of ω_j;

using said determined amplitude to determine values for a set of constants, ${}^{p}\mathbf{a}^{k}$, such that a function $f^{p}_{k}(\mathbf{V},\mathbf{a}^{k})$ provides an estimate of the current, $I^{p}_{k}(t)$, leaving said p^{th} output port at a frequency ω_k when a signal having the form

$$V(t) = \mathrm{Re}\sum_{k=1,H} V_k(t)\exp(j\omega_k t)$$

is input to said input port, where $V_k(t)$ is a component of the set of values $\mathbf{V}$; and

providing a simulator component adapted for use in a circuit simulator, said simulator component having a first simulator input port and P simulator output ports, said component returning a value, $f^{p}_{k}(\mathbf{V},\mathbf{a}^{k})$, via said p^{th} simulator output port when said simulator provides values for $\mathbf{V}$ at said first simulator input port for at least one value of k and p.